

Stimuli-Responsive and Antibacterial Cellulose-Chitosan Hydrogels Containing Polydiacetylene Nanosheets

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Abstract

Wound infection increases disease burden and reduces patient mobility. There is need to develop dressings that can detect and stop infection. This can be achieved encapsulating metal ions in stimuli responsive hydrogels.

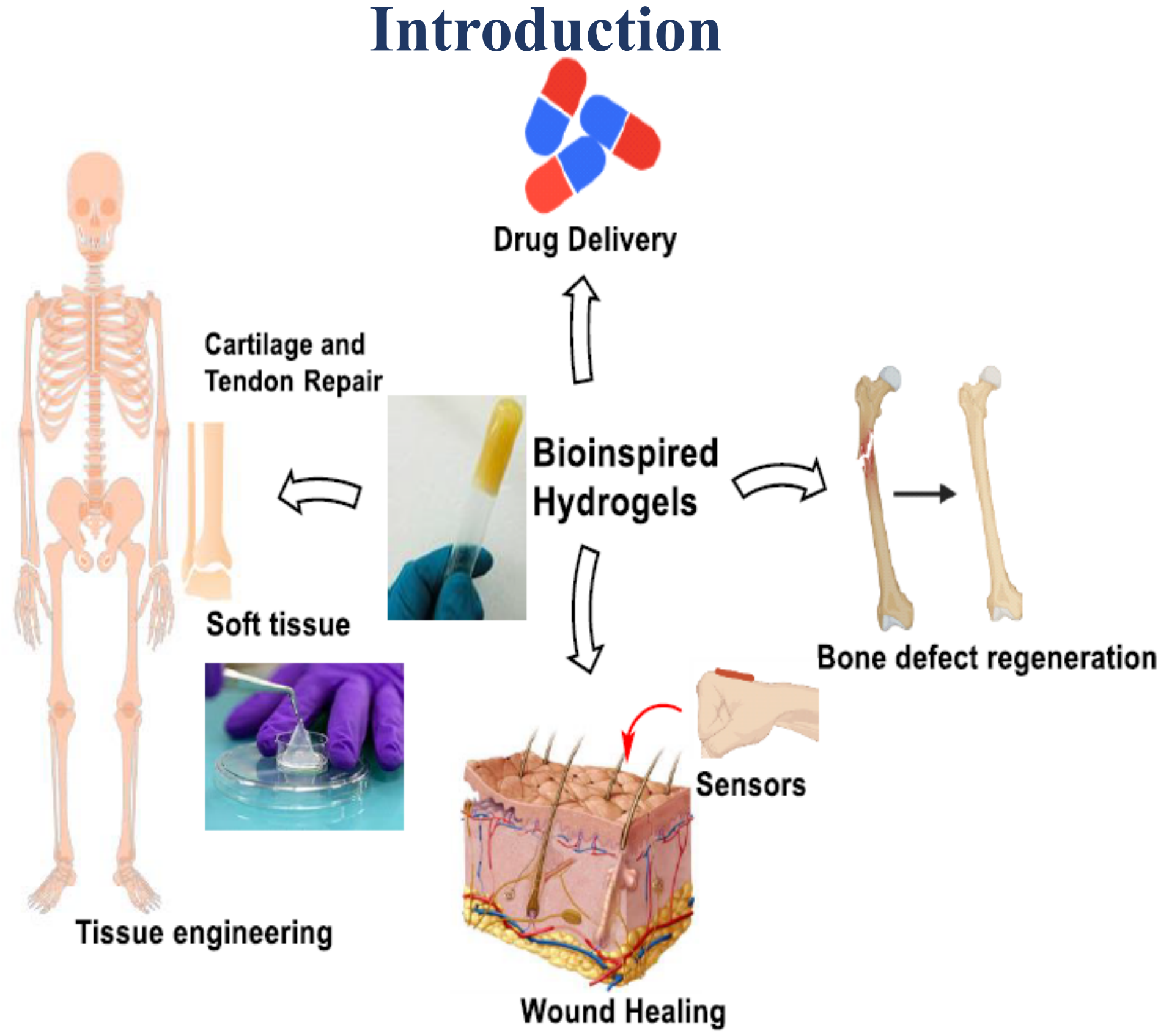


Fig 1: Applications of Hydrogels

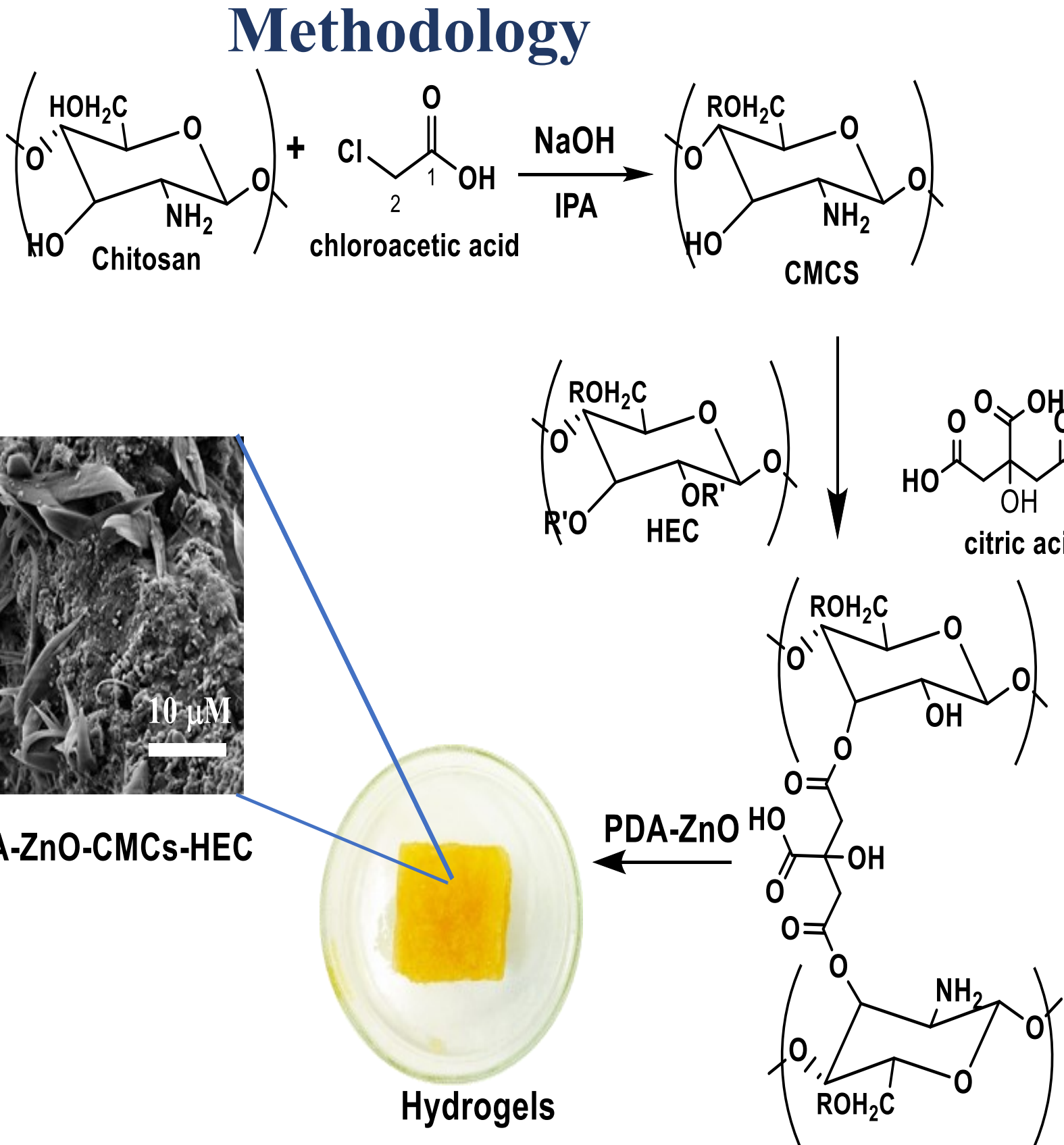


Fig 2: Preparation of cellulose hydrogels

Results and Discussions

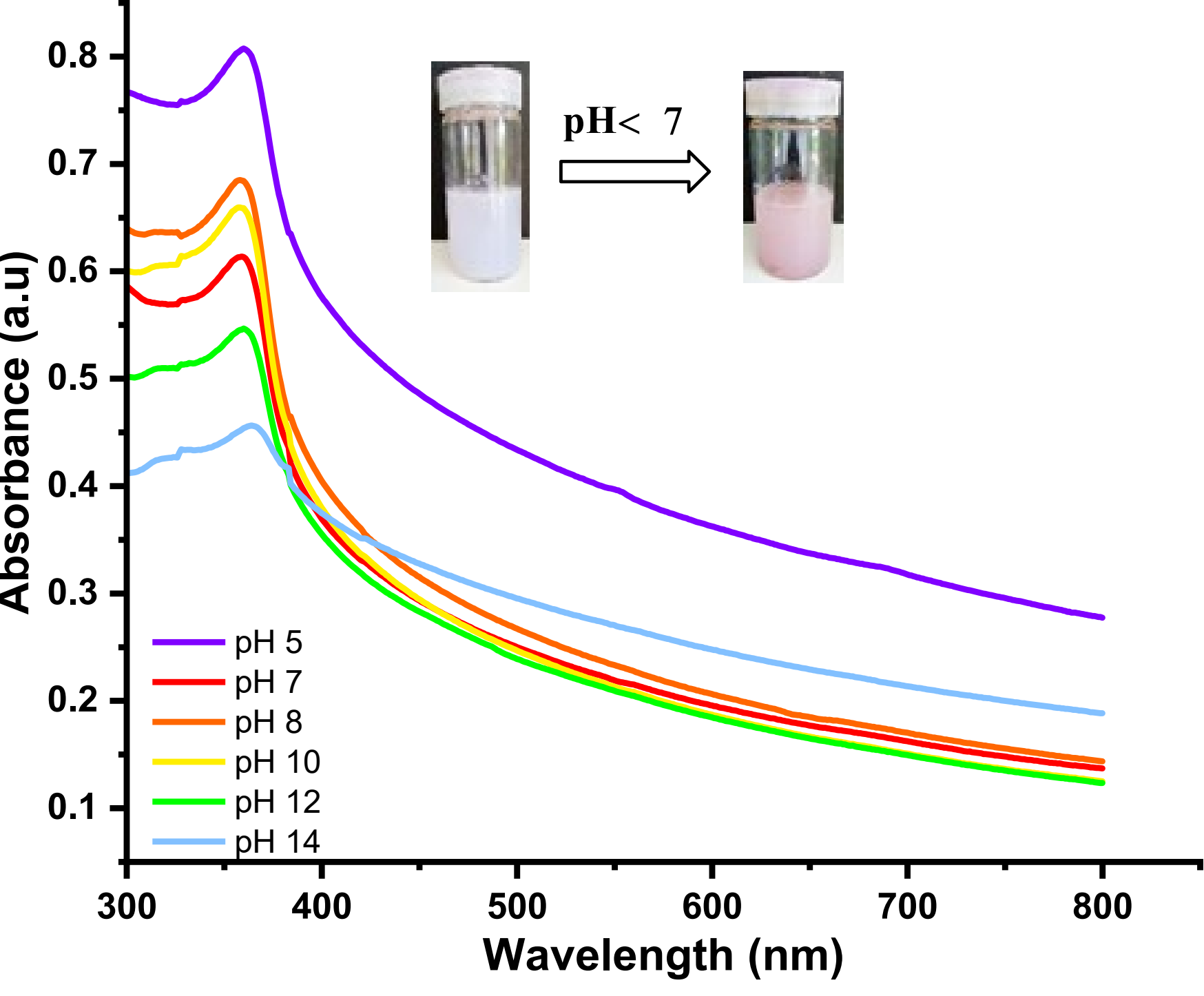
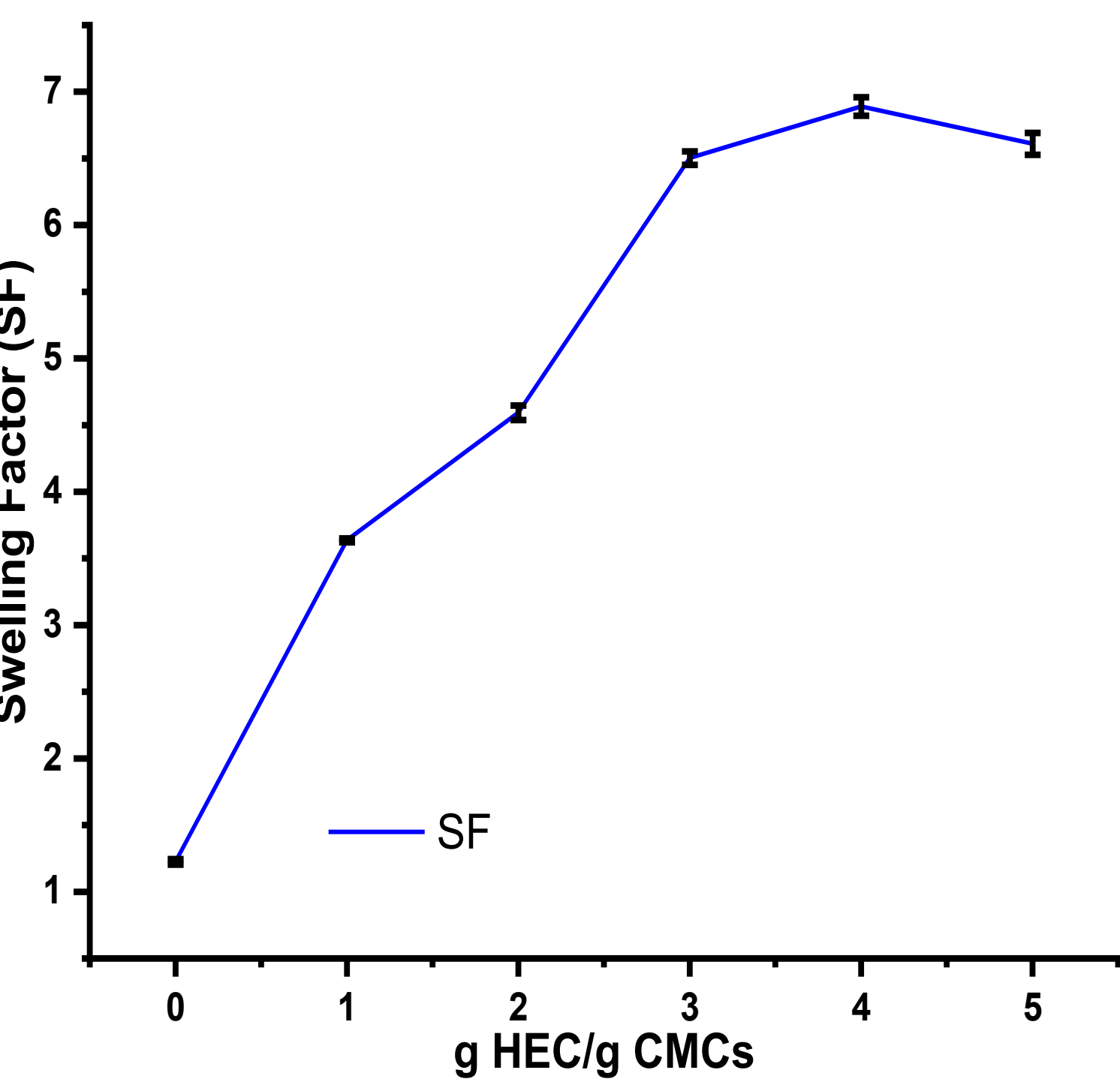


Fig 3: Swelling capacity (a) and pH responsive behaviour of the hydrogels (b)

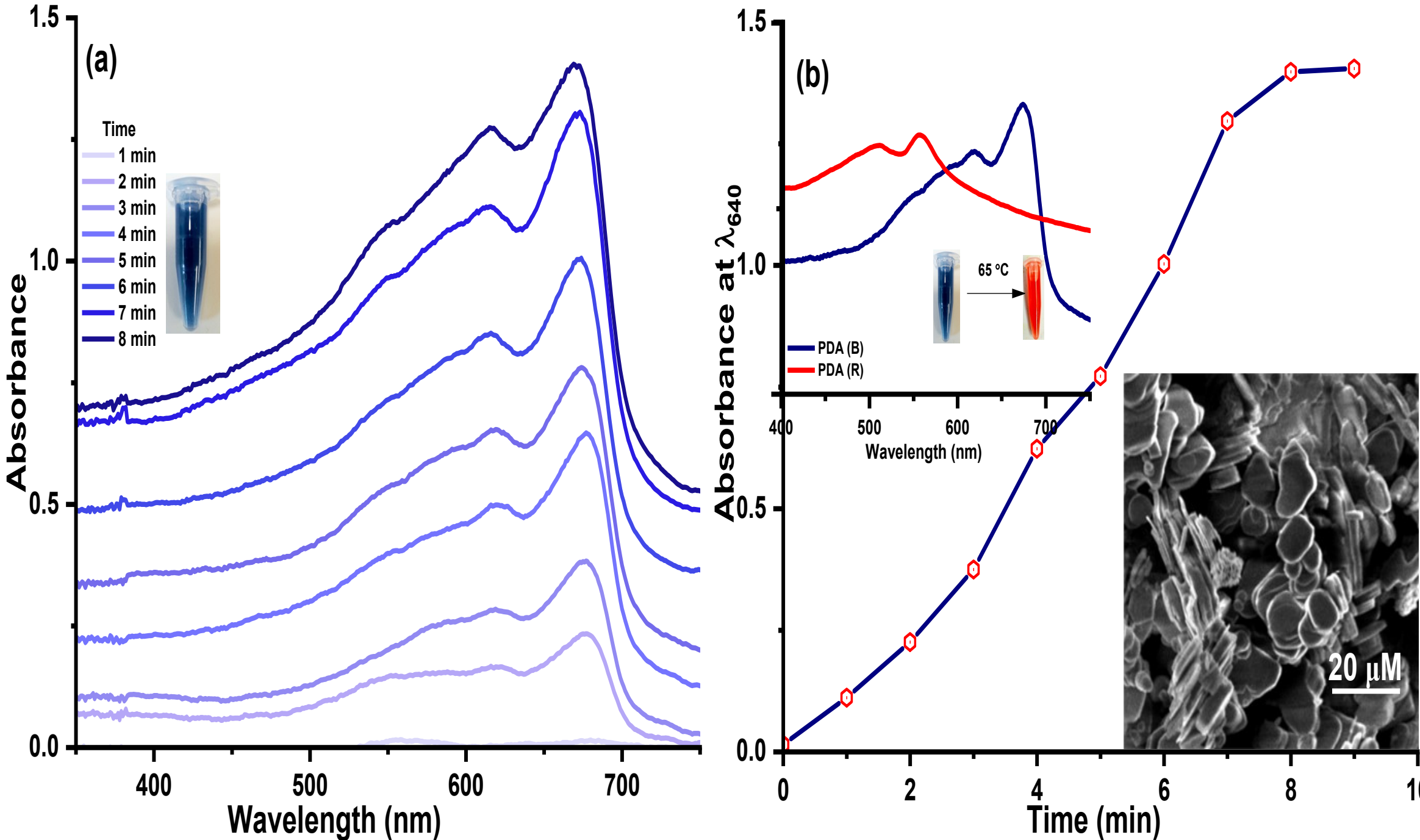


Fig 4: Synthesis of PDA (a) temperature responsive (b)

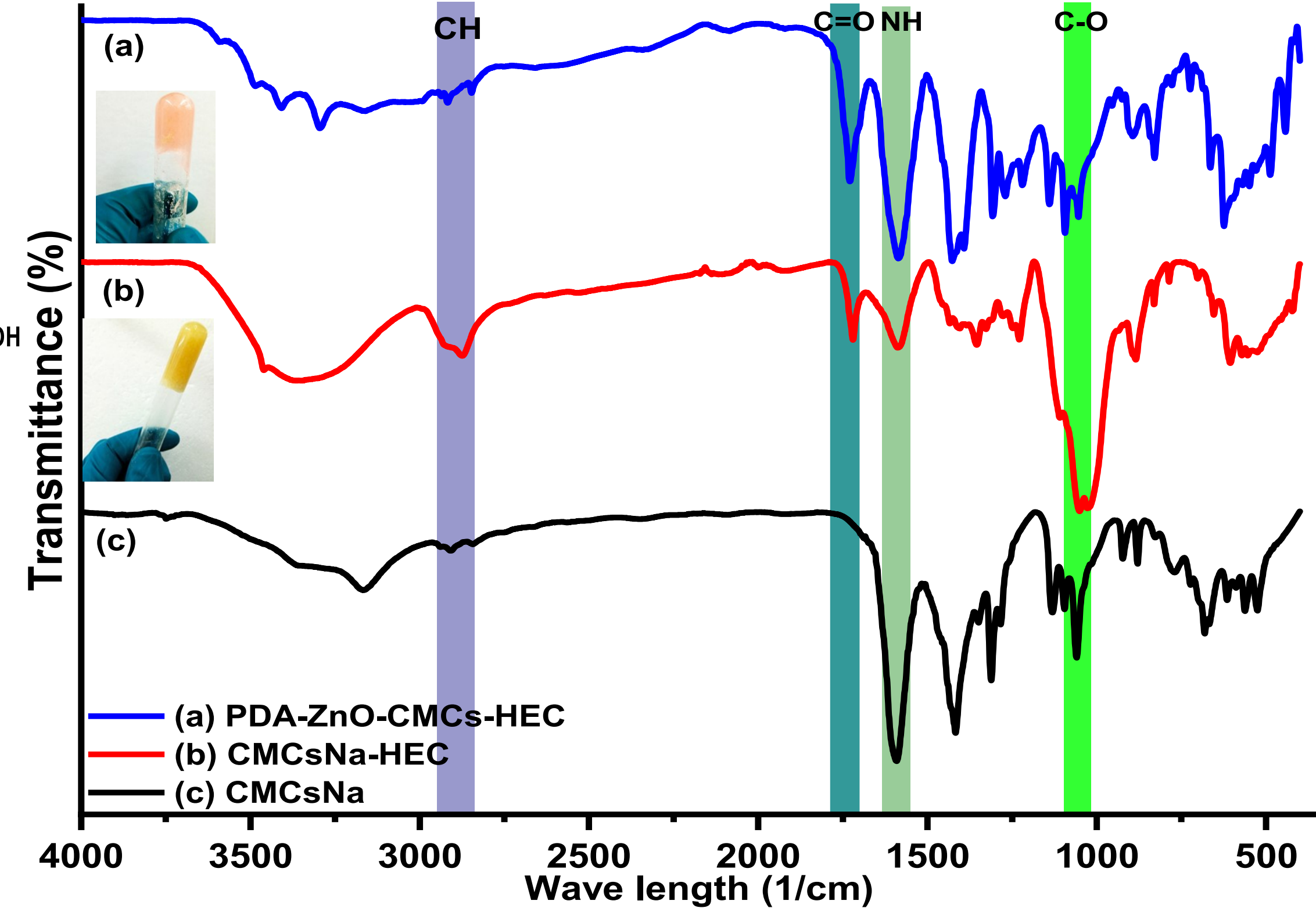


Fig 5: Functional group analysis of the hydrogels

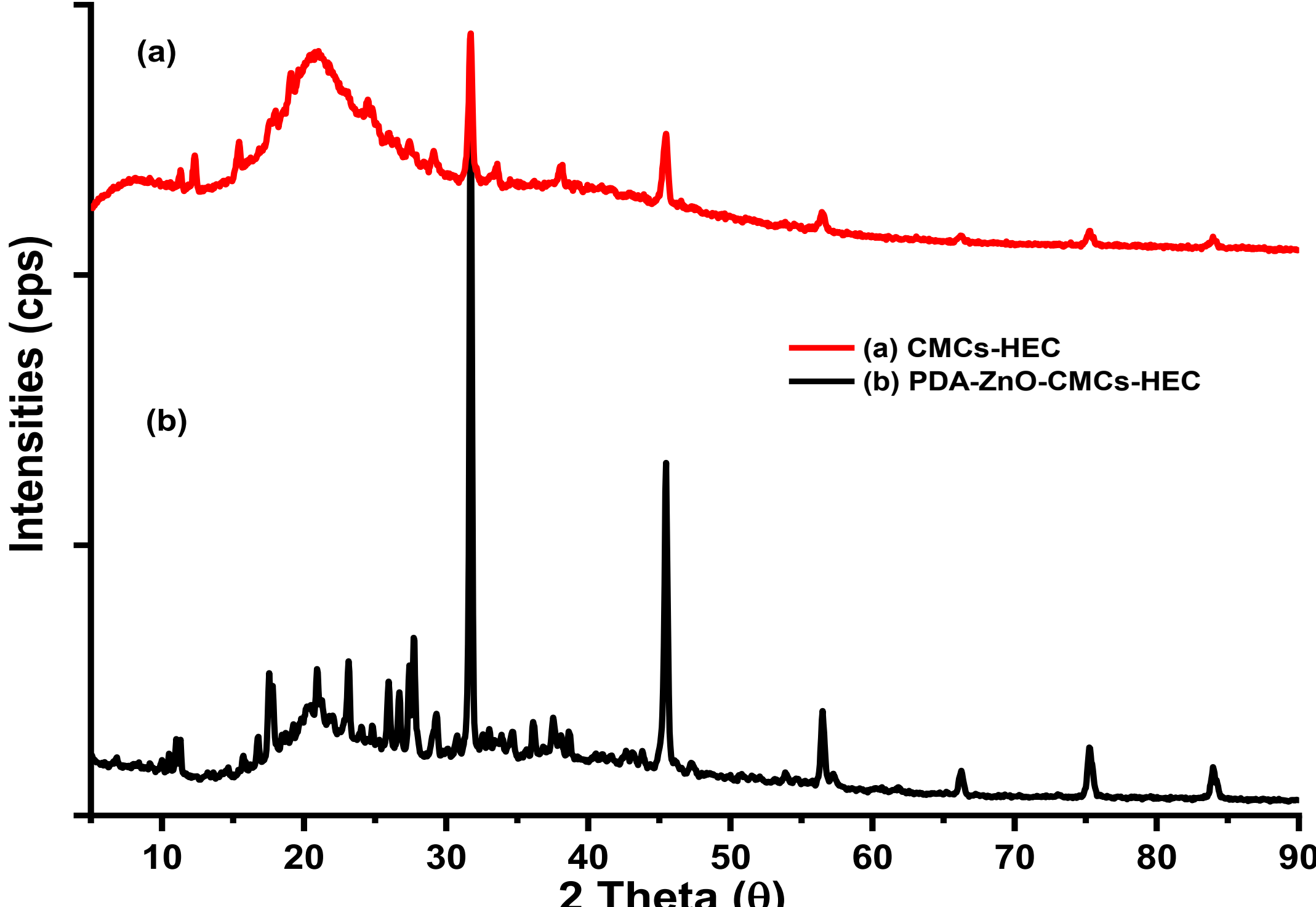


Fig 6: Powder diffractograms of PDA hydrogels

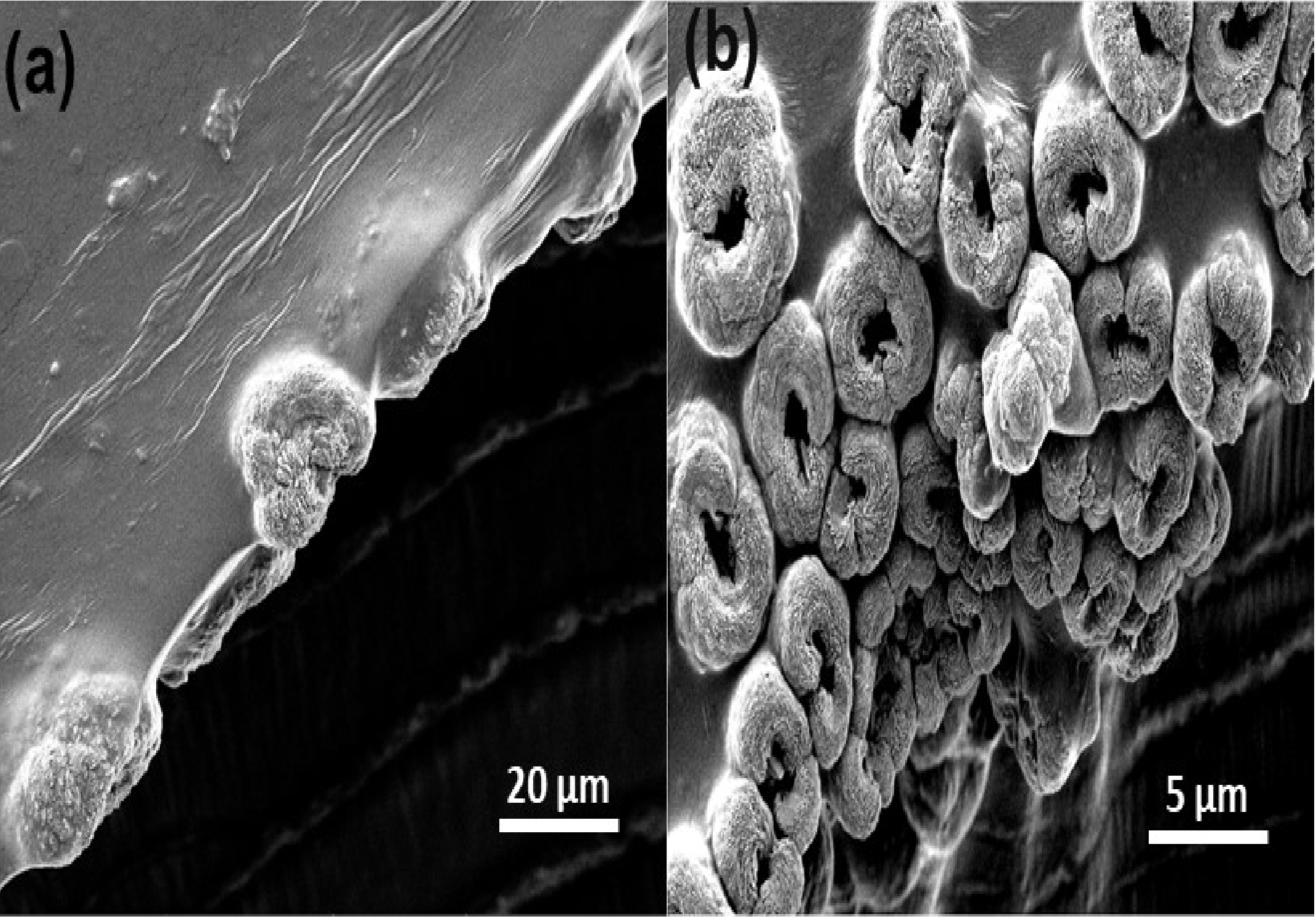


Fig 7: SEM micrographs of PDA hydrogels

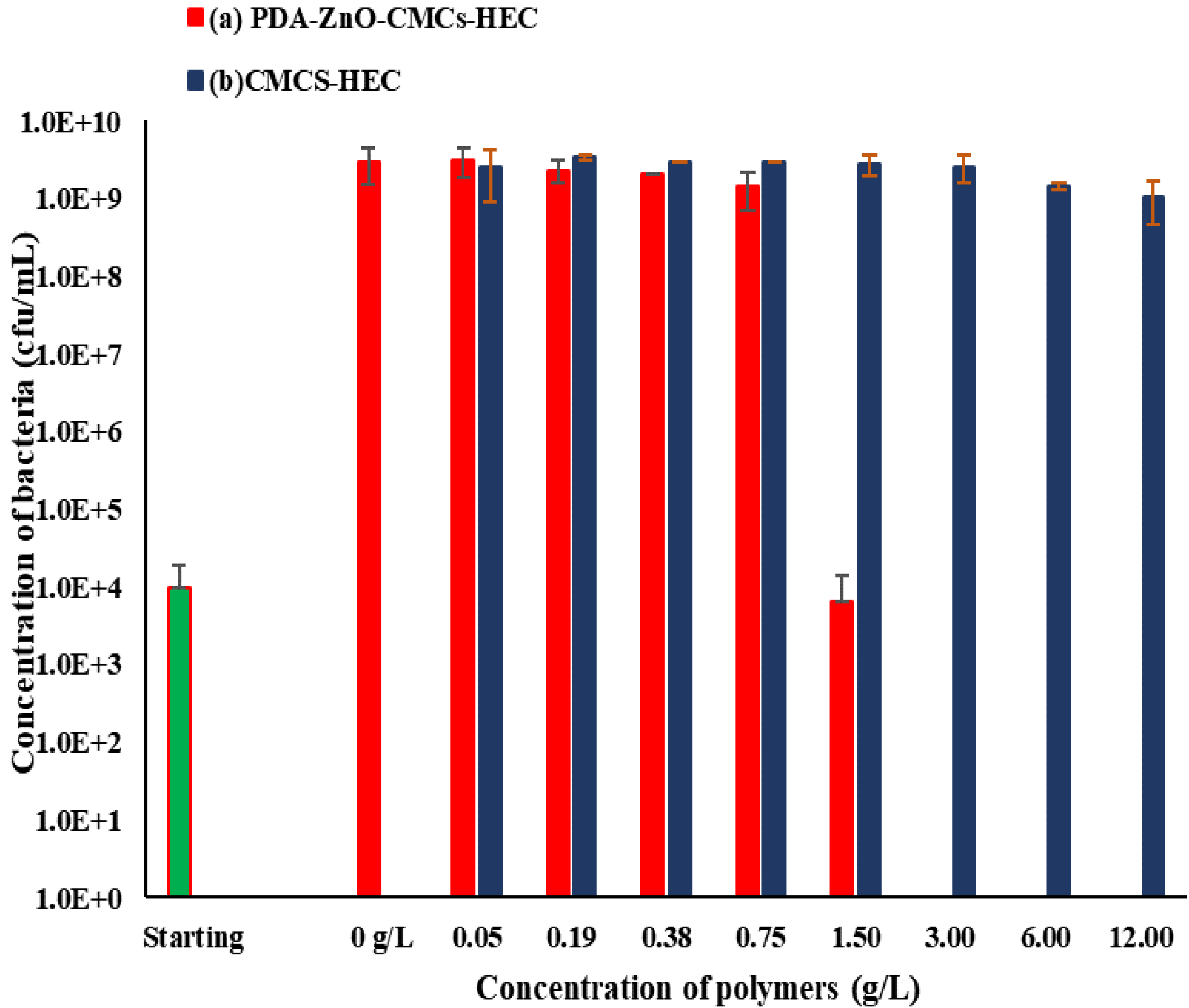


Fig 9: Minimum Inhibitory concentration of PDA hydrogels

Fig 8: Release of Zinc ion for microbial inhibition

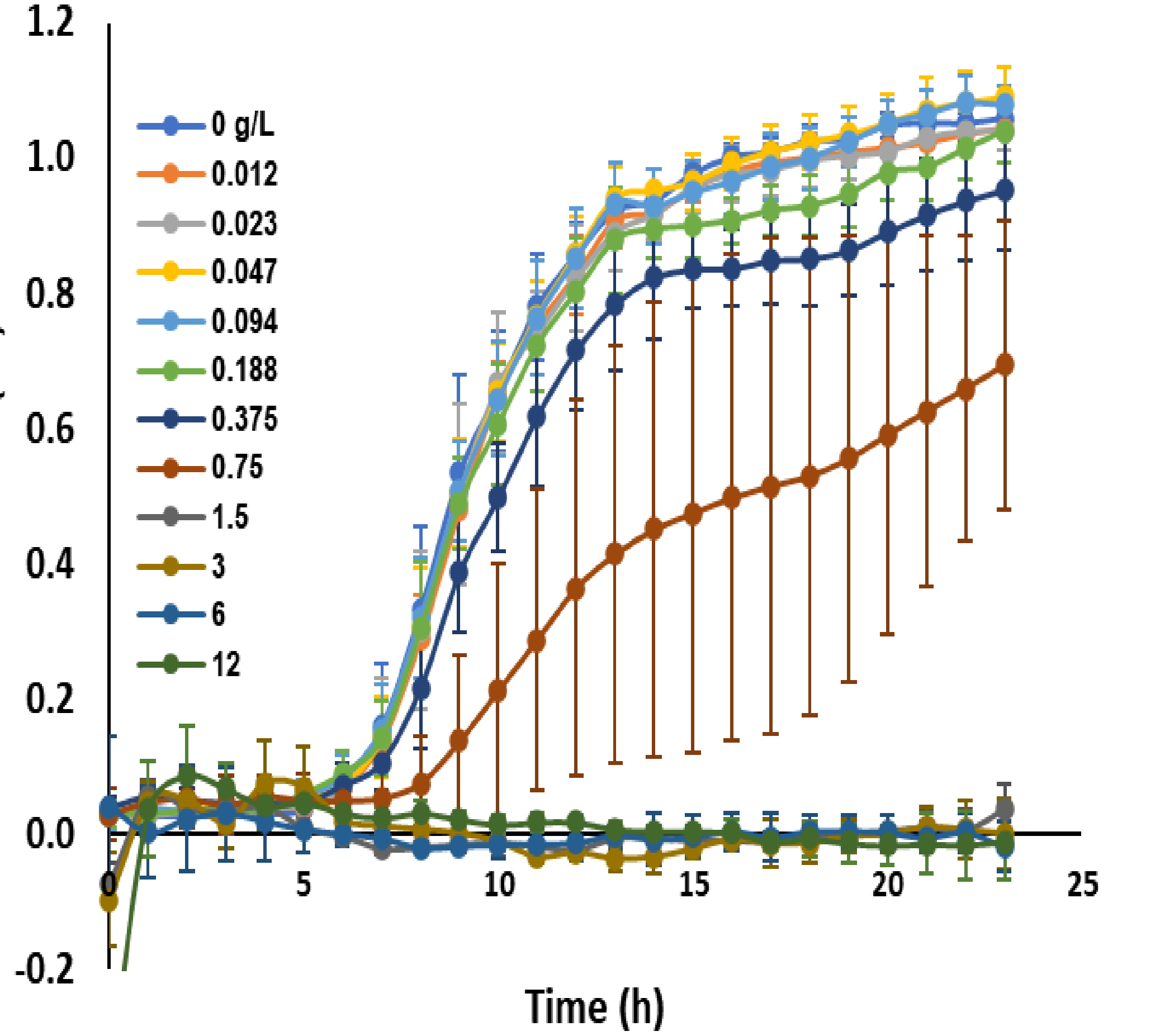


Fig 10: Growing bacteria in PDA-Cellulose hydrogels

Conclusions

We rationally combined PDA-ZnO nanosheets into CMCS-HEC hydrogel. We obtained a pH- and thermal-responsive PDA-ZnO-CMCs-HEC hydrogel. Have inhibitory activity against E. coli. and ability to detect onset of infection.

Acknowledgement

